

## **REMARKS**

Claims 1-13 are pending in this application. The Office has allowed claims 7 and 9-11. The office has rejected claims 1-6, 8, and 12-13 as follows: claim 1 is rejected under 35 U.S.C. § 112, second paragraph; claims 1-6, 8, and 12-13 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. In addition, the examiner has objected to the abstract as containing superfluous language.

In view of the remarks herein, the undersigned respectfully requests reconsideration of these rejections.

### **Rejection of Claim 1 under 35 U.S.C. § 112, Second Paragraph**

The Office has rejected claim 1 for lack of enablement, stating:

The claim language is vague and indefinite. For instance, although the preamble of independent claim 1 claims “a method for **extracting data . . .**”, the claim fails to recite the necessary detail physical structures/steps to perform the recited function(s) nor are there any recitation describing how such an apparatus (or elements)/steps are actually provided in the method. Sufficient detail apparatus, elements or steps must be recited to adequately describe and constitute the proposed method. Also, the claim seems to be incomplete in that it recite only a portion of the methodology required for the “method for extracting data” to become operational, i.e. it omits essential elements and/or steps. See MPEP 2172.01.

The undersigned respectfully submits that claim 1, when read in light of the specification, is reasonably definite, and therefore the undersigned requests that the Examiner withdraw this rejection. MPEP 2173.02 states that

Definiteness of claim language must be analyzed, not in a vacuum, but in light of:

- (A) The content of the particular application disclosure;
- (B) The teachings of the prior art; and

(C) The claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.

Furthermore, MPEP 2173.02 also states that the examiner “should allow claims which define the patentable subject matter with a reasonable degree of particularity and distinctness.” (Emphasis in original.)

Claim 1 is directed to a method of extracting useful data from an observed data set by projecting observed data vectors onto a subspace, where the projection is done in a particular way. One of ordinary skill in the art would understand that the result of the data projection is the extracted useful data. The specification discloses the use of vector subtraction in an original coordinate system to accomplish data extraction through projection onto a subspace, for example when interference is present (see paragraphs 0055-0056), and claims such a method in claim 1. The claim language stating that the projection onto a subspace is to be accomplished “as a vector subtraction in an original coordinate system” specifically states how the projection is to be done to extract the data of interest and provides sufficient detail to enable the claim when read in light of the specification, which teaches how to accomplish data projection in this manner (see paragraphs 0051-0056). This limitation specifically teaches how to implement the projection and thus enables the claim. Although prior to this invention one of ordinary skill would not know how to extract useful data by projecting data onto a subspace through vector subtraction in an original coordinate system, one of ordinary skill in the art would know without further guidance how to implement vector subtraction. Thus, the method as claimed, when read in light of the specification and in light of the understanding of one of ordinary skill in the art, is reasonably

enabled. For this reason, the undersigned submits that the claim is enabled and respectfully requests that the Examiner withdraw this rejection.

**Rejection of Claims 1-6, 8, and 12-13 under 35 U.S.C. § 101**

The Office has rejected claims 1-6, 8, and 12-13 as being directed to non-statutory subject matter, stating:

The claims recite a method for performing a mathematical function. The claimed invention comprises mental step(s) whereby the claimed mental steps are non-statutory subject matter. Specifically, the claimed method step(s) can be practiced mentally in conjunction with pen and paper.

However, in order for such a claimed computer-related process to be statutory, the method claims must include either a step that results: (1) in a physical transformation outside the computer, (2) in a limitation to a practical application, or (3) performed specific machine/element(s). Accordingly, claims 1-6, 8, and 12-13 are clearly directed to a non-statutory process.

The undersigned has made a careful and thorough review of 35 U.S.C. § 101 and the related guidelines set forth in the MPEP and fails to see how this rejection can be maintained. Initially, the undersigned notes that 35 U.S.C. § 101 states:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof may obtain a patent therefore, subject to the conditions and requirements of this title.

Claims 1-6, 8, and 12-13 are directed to methods of extracting useful information from observed data. As stated throughout the specification, the applicability of such methods extends across a wide range of technology areas, including sonar, radar, and cellular communications (see, e.g. paragraph 0035).

In the rejection, the Office suggests that the claims are mental steps void of any step that results in either (1) a physical transformation of the data, (2) a limitation to a practical application, or (3) a performed specific machine/element. With regard to sustaining a rejection for failure to claim statutory subject matter, MPEP 2106 II.a states:

Office personnel have the burden to establish a *prima facie* case that the claimed invention as a whole is directed to solely an abstract idea or to manipulation of abstract ideas or does not produce a useful result. **Only when the claim is devoid of any limitation to a practical application in the technological arts should it be rejected under 35 U.S.C. § 101.**

(Emphasis added). The undersigned respectfully submits that each of the rejected claims recites a limitation to a practical application and therefore should not be rejected under 35 U.S.C. § 101. The claims are directed to the practical application of processing observed data to extract information of interest and therefore accomplish a desired practical end.

For example, claim 1 recites in its entirety:

A method **for extracting data of interest from observed vector data**, the method comprising: determining the projection of each vector in observed vector data onto a subspace as a vector subtraction in an original coordinate system.

(Emphasis added). This claim is directed to the practical application of “extracting data of interest from observed vector data” and thus claims statutory subject matter. MPEP 2106.IV.B.2.b.ii states that subject matter is statutory where the claimed process is limited to a practical application of an abstract idea or mathematical algorithm in the technological arts. That same section of the MPEP gives as an example of a claimed statutory process “[a] digital filtering process for removing noise from a digital signal comprising the steps of calculating a mathematical algorithm to produce a correction signal and subtracting the correction signal from

the digital signal to remove the noise.” Analogously, claim 1 here recites “a method for **extracting data of interest from observed vector data**” comprising the steps of implementing vector subtraction in an original coordinate system. Extracting data of interest from observed data is analogous to (but not limited to) filtering observed data to remove noise and therefore constitutes statutory patentable subject material under 35 U.S.C. § 101.

Claims 2-6, 8, and 12-13 are similarly directed to practical application of processes involving observed data. In particular, claim 2 is directed to “a method for processing a block of discrete data vectors **to obtain a decomposition of the data with respect to a correlation vector.**” The specification teaches as an example that the claimed method results in extraction of data of interest from observed vector data (see paragraphs 0059 – 0063). As discussed above, extraction of data of interest from observed data is analogous but not limited to filtering data to remove noise and therefore constitutes statutory patentable subject material. Claim 3 implements this same method **in a filter.** Claim 4 is directed to “a method for adaptively analyzing data . . . **to estimate that part of the data that best corresponds to a steering vector . . .**” Estimating a part of data the corresponds to a steering vector is a practical limitation that renders the subject material of this claim statutory patentable subject material. Claim 5 similarly is directed to “a method for adaptively analyzing an observed signal . . . **to estimate that part of the signal that best corresponds to a steering vector . . .**” Claim 6 is directed to a “method for adaptively analyzing discrete data . . . **to obtain a decomposition of the data based on correlation . . .**” Claim 8 is directed to a “method for adaptively analyzing an observed signal . . . **to obtain a**

**decomposition of the data based on correlation . . .”** Finally, claim 12 and claim 13, which depends from claim 12, are directed to “**a method for filtering a signal . . .”**

Each of the rejected claims is directed to a practical application of extracting data of interest from observed data and therefore claims statutory subject matter limited to a practical application in the technological arts. As stated above MPEP 2106.IV.B.2.b.ii specifically gives as an example of patentable subject material filtering to remove noise from observed data. Extracting data of interest from observed data is analogous to, but not necessarily limited to, filtering data to remove unwanted portions of the data. As a result, the undersigned submits that the claimed subject matter is statutory and respectfully requests the rejection under 35 U.S.C. § 101 be withdrawn.

### **Objection to Abstract**

The Office has objected to the abstract “because superfluous language is used in this paragraph (i.e., ‘[t]he present invention . . .’). The undersigned respectfully requests further guidance with respect to the particular language that the Examiner finds objectionable. The undersigned has carefully studied the abstract has not found the language cited by the Examiner.

### **Conclusion**

The undersigned thanks the Examiner for allowing claims 7 and 9-11 and submits that claims 1-6, 8, and 12-13 are in condition for allowance and respectfully requests notice to this effect. Should the Examiner determine that any further action is necessary to place this application into better form, the Examiner is encouraged to contact the undersigned representative at the number listed below. In addition, if any additional fees are required in

connection with the filing of this response, the Commissioner is hereby authorized to charge the same to Deposit Account No. 501458.

Respectfully submitted,

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